

MORPHOLOGICAL VARIATIONS IN THE HEMELYTRA OF  
*CRYPHOCRICOS HUNGERFORDI* USINGER  
(HETEROPTERA: NAUCORIDAE)

ROBERT W. SITES

Department of Agronomy, Horticulture, and Entomology, Texas Tech University, Lubbock, Texas 79409-2134.

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*Abstract.* — Morphological variations in the hemelytra of *Cryphocricos hungerfordi* Usinger are described and illustrated. The distal margins of hemelytra of brachypterous forms are highly variable and may be straight, concave, convex, and asymmetrical. Additionally, a submacropterous form, intermediate between the brachypterous and macropterous forms, is described and illustrated. The northeasternmost record of the distribution of *C. hungerfordi* is now the South Llano River in central Texas.

*Key Words:* Insecta, creeping water bug, polymorphism, wing

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The Naucoridae, or creeping water bugs, consists of predacious, aquatic bugs that primarily are pantropical in distribution. These bugs are common components of both lotic and lentic faunas.

The genus *Cryphocricos* is restricted to the New World and La Rivers (1971, 1974, 1976) listed 14 species. Members of the genus are strongly dimorphic in thoracic development (Parsons 1974) which is associated with the brachypterous and macropterous conditions (Usinger 1941, 1947). The brachypterous form is more common than the macropterous form (Usinger 1941), and Parsons & Hewson (1974) considered macropters very rare.

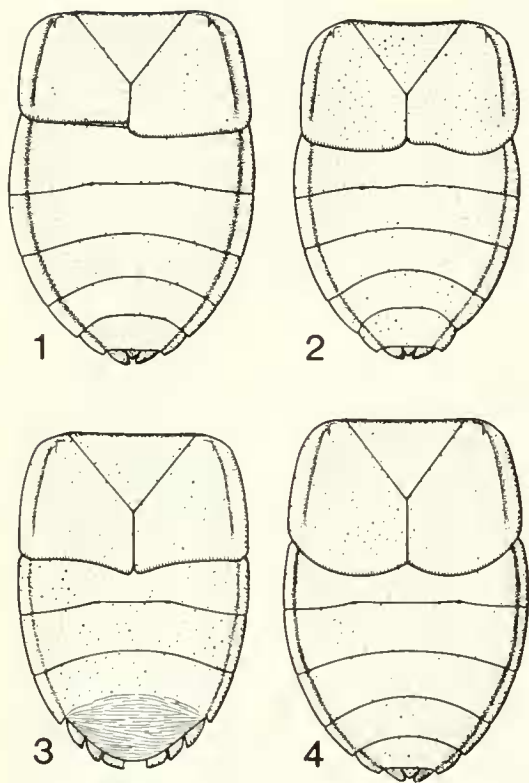
The only member of this genus known to occur in the United States is *Cryphocricos hungerfordi* Usinger. The range of this species is from Mexico north to central Texas. Thus far, in the U.S. it has been recorded from only the Frio, Nueces, and Pecos Rivers in Texas (Polhemus & Polhemus 1988). Usinger (1947) described this species from both brachypterous and macropterous forms, and the type specimen is brachyp-

terous. Usinger (1947) used the morphological condition of hemelytra in three of eight couplets in his key to the species of brachypterous forms of *Cryphocricos*.

Variations in hemelytral morphology of brachypterous *C. hungerfordi* are presented herein, and a third morphotype is described and illustrated. Additionally, the northeasternmost known limit of the range of *C. hungerfordi* is extended to the South Llano River in central Texas. Voucher specimens of each morphotype and the extremes of variation in the brachypterous condition are deposited in the Texas Tech University Entomological Collection.

#### STUDY SITE

A total of 790 adults of *C. hungerfordi* was collected from a single population in the South Llano River on the Texas Tech University Center campus in Junction, Kimble Co., Texas, from April 1988 through January 1989. The South Llano River is on the Edwards Plateau and is north of the Balcones Fault Zone. This locality is ca. 160–250 km north and northeast of the previous



Figs. 1-4. Morphological variations in the hemelytra of brachypterous *Cryphocricos hungerfordi*.

records of *C. hungerfordi*, which were in the vicinity of the Balcones Fault Zone (Polhemus & Polhemus 1988) and represents the northeasternmost known limit of the range of this species.

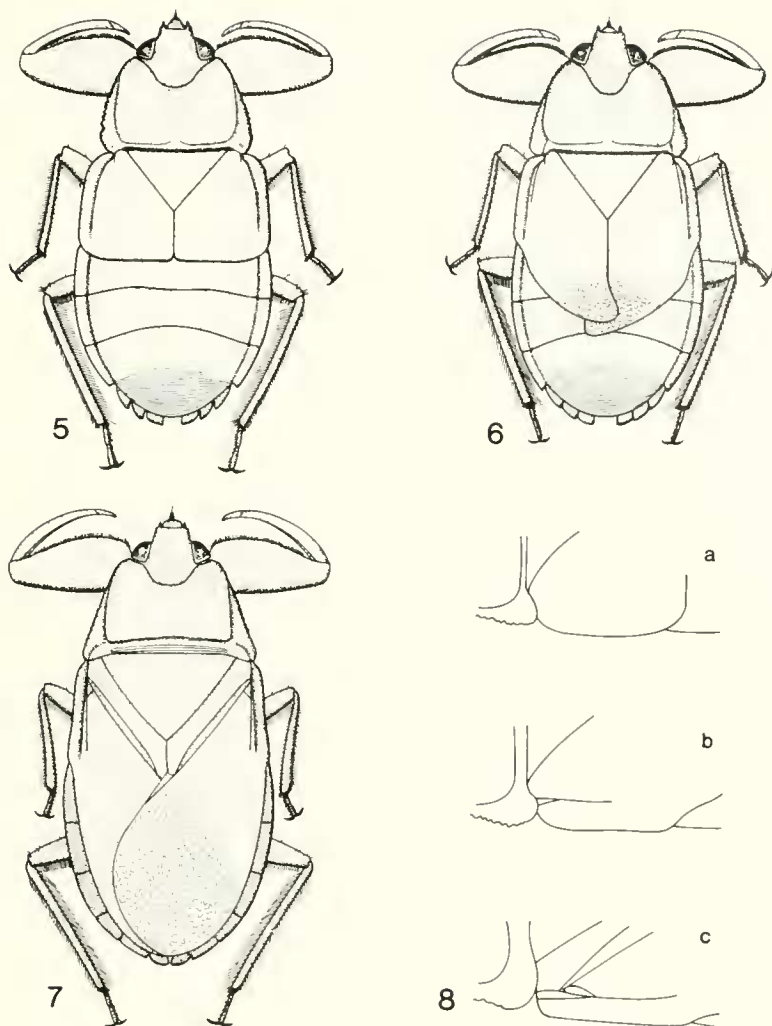
#### MORPHOLOGICAL VARIATIONS IN HEMELYTRA

**Asymmetry.**—Asymmetry in the hemelytra is common in the brachypterous forms. Specimens preserved in alcohol were examined and illustrated prior to pinning; thus, the asymmetry is not an artifact of pinning. Generally, asymmetry is evidenced as one wing shorter than the other (Fig. 1). This was apparent in many specimens with straight distal margins. Additionally, asymmetry was noted as hemelytra of different shapes (e.g. one straight and one sinuate distal margin [Fig. 2]). The illustration of the

brachypterous male in the original description (Usinger 1947) appears to approach this condition. Whether this was intentional or an imperfection in drawing is not known, as there is no mention of asymmetry in the text.

**Brachyptery.**—Symmetrical morphological variations in the hemelytra of brachypterous specimens are continuous, rather than falling into discrete categories of variation described here. The distal margins may be concave with the posteromedial corners produced (Fig. 3). In addition to the concavity, the angle of the distal margins may slope caudad toward the midline. A second variation is that of highly rounded distal margins (Fig. 4). Curvature is continuous from the posteromedial corners and the distal margins merge with the costal margins. The posterolateral corners generally are poorly defined. The form that typically is described in keys (e.g. Polhemus 1984) has truncate, squared-off hemelytra (Fig. 5). Illustrations in the original description (Usinger 1947) showed the female to have straight distal margins of the hemelytra.

**Submacroptery.**—In addition to the variable brachypterous forms and macropterous form (Fig. 7), a submacropterous form exists (Fig. 6). Usage of the term submacropterous is consistent with terms proposed by Slater (1975) to classify the major types of hemelytral structure. In this condition the wings extend to the 5th abdominal tergum and are represented by both corium and membrane, whereas membrane is absent in the brachypterous form. The hemelytral apices are produced and overlap. The percentage of each hemelytron represented by the embolar area (14.0), measured at the level of the apex of the scutellum, is intermediate between that of the wider brachypterous ( $14.9 \pm 0.2$  [ $\bar{y} \pm SE$ ]) and narrower macropterous ( $11.5 \pm 0.9$ ) forms. The posterior margin of the pronotum and the humeral region of each hemelytron, including the embolar suture, are intermediate in degree of development as compared with bra-



Figs. 5-8. 5-7. Brachypterous, submacropterous, and macropterous morphotypes, respectively, of *Cryphocricos hungerfordi*. 8. Dorsolateral view of humeral angle of left hemelytron in brachypterous (a), submacropterous (b), and macropterous (c) morphotypes of *Cryphocricos hungerfordi*. Note intermediate level of development of sutures and pronotum of submacropterous form.

chrypterous and macropterous forms (Fig. 8). Because only one male submacropterous specimen was collected, it was not dissected to examine the extent of intermediate conditions of the thorax and for presence of hindwings.

#### DISCUSSION

A total of 790 adults was collected in the South Llano River; six were macropterous

(0.8%) and one was submacropterous (0.1%). The remainder (783 specimens) were brachypterous. With the discovery of the submacropterous form, this species should be referred to as polymorphic rather than dimorphic.

Lindroth (1949) concluded that for certain carabids, environmental uncertainty favors alary dimorphism, but in a stable environment brachyptery predominates.

Additionally, Slater (1972) suggested that the proportion of species with alary polymorphism may not only indicate ecological stability of that area, but also stability in terms of evolutionary time. The South Llano River is a stable environment for naucorids (water temperature no colder than 11.5°C during the winter and a constant abundance of prey). Therefore, because the brachypterous form is predominant and the macropterous form is present at such a low frequency, it is unknown whether the submacropterous form is aberrant or a consistent morphotype at a very low frequency of occurrence.

Despite the diverse variations in the brachypterous condition, *C. hungerfordi* still may be identified with the key prepared by Usinger (1947). However, if this kind of variation is present in brachypterous forms of *C. barozzii* Signoret, *C. breddini* Montandon, *C. peruvianus* De Carlo, or *C. rufus* De Carlo, many specimens cannot be identified properly with the key because couplet six uses the shape of the "apical margins of hemelytra." Studies on populations of those species are needed to determine the extent of this morphological variation.

#### ACKNOWLEDGMENTS

I am grateful to Ms. Becky Nichols for assistance with field collection of specimens. I thank Thomas J. Henry (Systematic Entomology Laboratory, USDA-ARS, % United States National Museum) for allowing me to examine USNM naucorid specimens and literature. I also thank L. Chandler, H. G. Thorvilson (Texas Tech University), and J. T. Polhemus (3115 S. York, Englewood, Colorado 80110) for critical reviews of this manuscript. I would also like to thank Robert C. Albin for providing support through Texas State Organized Research funds and C. Len Ainsworth for support from the State of Texas Special Line Item: Texas Tech University Center at

Junction. This is Contribution No. T-4-263, College of Agricultural Sciences, Texas Tech University, Lubbock, Texas.

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